Degree Type – Bachelor of Science in Engineering Physics (BS)
Degree Title – Engineering Physics

The Engineering Physics Program offers the Bachelor of Science in Engineering Physics. Engineering Physics program covers a broad field with applications in most of engineering areas to meet student demand as well as regional, national, and international needs. The program seeks to improve the human condition through the education of skilled engineers to succeed and lead in industry, government, and commerce, and through development and establishment of internationally recognized research. A spectrum of programs will provide a palette of engineering skills, by educating a broad base of engineering applicants to the various engineering tracks.

With this degree, students will be eligible for a variety of positions in engineering, technology, sciences and graduate school in many disciplines including engineering, science, business, and medicine. Graduates of this program are also qualified to be high school math and science teachers with a short alternative certification program for which scholarships are available. Engineering Physics Program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012.

STUDENT LEARNING OUTCOMES:

1. **An ability to apply knowledge of mathematics, science, and engineering**
2. **An ability to design and conduct experiments, as well as to analyze and interpret data**
3. **An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability**
4. **An ability to function on multi-disciplinary teams**
5. **An ability to identify, formulate, and solve engineering problems**
6. **An understanding of professional and ethical responsibility**
7. **An ability to communicate effectively**
8. **The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context**
9. **A recognition of the need for, and an ability to engage in, life-long learning**
10. **A knowledge of contemporary issues**
11. **An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.**

A – GENERAL EDUCATION CORE – 42 HOURS

Students must fulfill the General Education Core requirements. The courses listed below satisfy both degree requirements and General Education core requirements.

Required

Mathematics – 3 hours

MATH 2413 Calculus I (or MATH 2487 Honors) three-hour lecture

Life and Physical Sciences – 6 hours

PHYS 2425 Physics for Scientists and Engineers I three-hour lecture
PHYS 2426 Physics for Scientists and Engineers II three-hour lecture

Language, Philosophy, and Culture – 3 hours

PHIL 1310 Ethics, Happiness, and the Good (Must be Engineering section)

Integrative and Experiential Learning – 6 hours

CHEM 1111 General Chemistry I Lab
PHYS 2425 Physics for Scientists and Engineers I one-hour lab
PHYS 2426 Physics for Scientists and Engineers II one-hour lab
CSCI 1380 Computer Science I (or CSCI 1387 Honors)

B – MAJOR REQUIREMENTS – 86 HOURS MINIMUM (44 advanced minimum)

1 – Engineering Physics Core – 56 hours (27 advanced)

a – Engineering Core – 35 hours (18 advanced)

ENGR 1201 Introduction to Engineering
ENGR 1206 Introduction to Engineering Design
ENGR 2105 Linear Circuits Lab
ENGR 2301 Engineering Mechanics I: Statics
ENGR 2302 Engineering Mechanics II: Dynamics
ENGR 2305 Linear Circuits
ENGR 2308 Engineering Economics
ENGR 3121 Electronics I Lab
ENGR 3303 Engineering Thermodynamics
ENGR 3304 Mechanics of Materials
ENGR 3321 Electronics I
ENGR 4242 Senior Design Project I
ENGR 4243 Senior Design Project II
ENGR 4441 Control Systems

b – Physics Core – 6 hours (6 advanced)

PHYS 3311 Mathematical Methods in Physics I
Choose one:
CSCI 3350 Numerical Methods
MATH 3343 Introduction to Mathematical Software
PHYS 4390 Computational Methods for Engineers and Scientists

c – Mathematics Support Courses – 12 hours (3 advanced)

MATH 2413 Calculus I (or MATH 2487 Honors) one-hour lecture
MATH 2414 Calculus II (or MATH 2488 Honors)
MATH 2415 Calculus III
MATH 3341 Differential Equations

d – Chemistry Support Course – 3 hours

CHEM 1311 General Chemistry I

2– Engineering Concentrations – 30 hours minimum (17 advanced minimum)

a – Bioengineering – 34 hours (18 advanced)

BENG 4120 Molecular Bioengineering Lab
BENG 4320 Molecular Bioengineering
BIOL 1406 General Biology I (or BIOL 1487 Honors)
BIOL 1407 General Biology II (or BIOL 1488 Honors)
CHEM 1112 General Chemistry II Lab
CHEM 1312 General Chemistry II
CHEM 2123 Organic Chemistry I Lab
CHEM 2323 Organic Chemistry I
ENGR 4406 Engineering Mechanics III: Fluid Mechanics
PHYS 3315 Physics of Biological Systems
PHYS 3402 Modern Physics
PHYS 4315 Analysis of Biomolecules by Physical Methods

b – Computer Engineering – 31 hours (21 advanced)

CSCI 2333 Computer Organization and Assembly Language
CSCI 2380 Computer Science II

CSCI 3310 Discrete Data Structures
CSCI 3326 Object Oriented Programming in JAVA
CSCI 3333 Algorithms and Data Structures
CSCI 3334 Systems Programming
CSCI 4310 Design and Analysis of Algorithms
CSCI 4335 Computer Architecture
ENGR 2130 Digital Systems I Lab
ENGR 2330 Digital Systems I
MATH 3331 Applied Statistics I

c – Electrical Engineering – 30 hours (20 advanced)

i – Electrical Engineering – 24 hours (20 advanced)

ENGR 2130 Digital Systems I Lab
ENGR 2330 Digital Systems I
ENGR 3330 Linear Signals and Systems
ENGR 4322 Electronics II
ENGR 4423 High Frequency Engineering
ENGR 4326 Power Electronics
ENGR 4425 Analog and Digital Communications
Choose one:

ENGR 3327 Engineering Electromagnetics
PHYS 3301 Electromagnetic Theory I

ii – Electrical Engineering Electives – 6 hours

Courses must be approved by engineering advisor.

d – Mechanical Engineering Track – 30 hours (17 advanced)

i – Mechanical Engineering Core – 24 hours (17 advanced)

ENGR 1304 Engineering Graphics I
ENGR 2340 Engineering Materials
ENGR 2140 Engineering Materials Lab
ENGR 4309 Mechanical Subsystem Design
ENGR 4310 Heat and Mass Transfer
ENGR 4406 Engineering Mechanics III: Fluid Mechanics
ENGR 4407 Manufacturing Process Technologies
Choose one:

ENGR 3327 Engineering Electromagnetics
PHYS 3301 Electromagnetic Theory I
PHYS 3305 Classical Mechanics

ii – Mechanical Engineering Electives – 6 hours

Courses must be approved by engineering advisor.

TOTAL CREDIT HOURS FOR GRADUATION (MINIMUM) – 128 HOURS

TOTAL ADVANCED HOURS (MINIMUM) – 44 HOURS

ADMISSION, PROGRESSION, AND GRADUATION REQUIREMENTS, if applicable:

Admission requirements

Completion of ENGR 2301 with a minimum grade of ‘C’.

Progression requirements

To begin ENGR 4242, students must pass the Upper Division Engineering Exam, after which the program will submit documentation to the Office of the Registrar.

Graduation requirements

A grade of 'C' or better is required in MATH 2413 (or MATH 2487 honors), MATH 2414 (or MATH 2488 Honors), MATH 2415, ENGR 2301, ENGR 2305, ENGR 2105, and a composite GPA of 2.2 or better is required in all major coursework.